



## Advanced Welding Tool

Whitewater canoeing is a growing sport and one that sometimes poses a problem for its devotees: canoe gashes are frequent but very difficult to repair. The reason is that many canoes are made of plastics and there are few means of repairing these materials. Canoeists who live in the Potomac River area of Virginia are lucky—they have Dave Brown, whose Great Falls Canoe and Kayak Repair, Vienna, Virginia is one of only two canoe repair facilities in the eastern U.S. Brown has developed special repair techniques based on operation of the Inductron Toroid Welder he is using at right. Canoe repair is only one of a great many applications for this versatile spinoff device, which is produced under NASA license by Inductron Corporation, Grafton, Virginia.

The welder was originally developed by Langley Research Center as a tool that could be used in any atmosphere, including the airless environment of space. It was developed specifically for joining parts made of plastic or composite materials, which are difficult to join by conventional methods. Adhesive bonding is not reliable in a vacuum, riveting techniques often deform the plastic, and mechanical fasteners require hole preparation and special hardware. So the Langley developers decided on induction, or magnetic heating, which causes little or no deformation and can be used with almost any type of thermoplastic material. An induction coil transfers magnetic flux through the plastic to a metal screen, which is sandwiched between the sheets of plastic to be joined. When the welder is energized, the alternating current produces inductive heating on the screen, causing the adjacent plastic surfaces to melt and flow into the mesh. This creates a bond of the total surface area, where conventional hot gas welding produces only a peripheral bond.

The commercial Inductron model is a self-contained, portable welding gun with a switch on the handle to regulate the temperature of the plastic-melting screen. Capable of joining dissimilar materials, which may be thermoplastic or non-thermoplastic, the welder has a broad range of applications in the automobile, appliance, aerospace and construction industries.

